MC0164

HOSPITAL TECHNICAL MEMORANDUM

FIRE PRECAUTIONS: FISH FRYERS

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MINISTRY OF HEALTH : LONDON : HER MAJESTY'S STATIONERY OFFICE
JUNE 1962 PRICE 1s. 0d. NET.

MINISTRY OF HEALTH HOSPITAL TECHNICAL MEMORANDUM NO. 3

Fire Precautions: Fish Fryers

CONTENTS

I Scope.

II Fire risks.

III Design.

IV Installation.

V Operation and maintenance.

VI Fire extinguishers.

Appendix.

I. Scope

1. This memorandum outlines measures to reduce the fire risks associated with fish fryers and makes recommendations for fighting fires should they occur. It should be read in conjunction with the advice given in Hospital Memorandum (56)36 on hospital fire precautions generally.

II. Fire risks

2. The record which the Ministry keeps of fires in hospitals shows that of all equipment used, fish fryers are most frequently involved, and that the cause of these fires is the overheating of the fat or oil in the fryers.

3. When fats are heated above certain temperatures (see Appendix) a flame will cause oil vapour to ignite; at still higher temperatures spontaneous ignition will occur which can be terminated only by a rapid lowering of the temperature or the exclusion of oxygen for combustion. The large amount of fat contained in fish fryers is capable of supporting a fire for a period long enough to cause considerable damage. For safe operation, therefore, the temperatures of cooking fats must be held at levels below their respective flash points. This is best done by the use of reliable, automatically operating thermostats. Even so, adequate and suitable means of extinquishing a fire must be available close to every fryer.

III. Design

4. Most fish fryers in hospitals are heated by gas or electricity and the advice which follows on design relates only to fryers using these fuels.

Temperature control

5. Each pan of a fryer should have a thermostat with the temperature-sensitive element in the cooking pan. The thermostat element should be carefully positioned so that it is, as far as is practicable, in the hottest zone of the fat, and so that it will not become uncovered when the level of fat falls through evaporation. Thermostats may be designed to function either as high temperature cut-outs, pre-set to operate at the maximum recommended temperature for frying (usually 370° F) and with temperature settings adjustable only by the use of a tool, or, alternatively, as an adjustable thermostat by means of which the frying temperature required on any particular occasion can be regulated: with the latter type it is important to ensure that the maximum possible setting is safely below the flash point of the fat used. The element should be protected against mechanical damage by, for example, the frying baskets.

Construction

6. Pans should be an integral part of the hob and not removable. The surround or hob should be an impervious barrier preventing fat and cleaning water from reaching the heating elements, and should be wide enough to prevent splashed fat from igniting. All seams should be welded. The general lines of the surround should be smooth and corners should not be capable of accumulating fat. Nor should hoods or other attachments have cracks or ridges in which fat might collect. The design should ensure that no surface which might be splashed is exposed to flames or to high temperatures, and should make cleaning easy.

Gas heated appliances

(a) Main gas tap

7. The tap controlling the main burners should be easily accessible but designed to prevent inadvertent operation.

(b) Connections

8. Wherever practicable, rigid metal piping and screw type connectors should be used. Where it is essential to use flexible tubing and connections they should comply with B.S.669.

(c) Ignition

9. A pilot flame should be provided to ignite the main burners. A safety interlock and flame-proving device should be embodied to prevent gas being supplied to the main burners unless the pilot jet is alight and in position for igniting the main burners.

10. The pilot burner (or main burner in the absence of a pilot burner) should be accessible for lighting and easily seen, either directly or by reflection, when being lit.

(d) Combustion

11. Combustion standards should be in accordance with B.S.717.

(e) Governor

12. It is desirable that a pressure governor should be provided in the gas input line.

(f) Flue

13. The size of the flue should be adequate to remove all products of combustion. It should comply with B.S.567, B.S.835, and B.S.715, as appropriate. The flue should be completely separate from the cooking fume flue to prevent any possibility of a spark from the former reaching the latter.

Electrically heated appliances

(a) Heating elements

14. These should be completely metal-clad.

(b) Electric wiring

15. Wiring which is subjected to abnormal temperatures should preferably have single nickel conductors, not less than 0.080 in. in diameter, with suitable heat-resisting insulation, e.g. extruded silicone rubber insulation as specified in B.S.3258 for 250/440 volt single-core cables or with silicone rubber sleeving Type S, class 180 RT as specified in B.S.2848. A junction box should be provided to accommodate a fully shrouded mechanical type connector for joining the normal and high temperature grade wiring.

16. It is preferable that the appliance should be connected to the supply by means of M.I.M.S. cable or wiring enclosed in screw-jointed conduit. Where it is necessary for the appliance to be movable a heavy duty 3 core tough rubber or P.V.C. sheathed flexible cable, complying with B.S.7 or B.S.2004, as appropriate, should be used.

(c) Switches

17. A mains isolating switch should control both poles of the supply. Thermostats and any other single pole auxiliary switches should be incorporated in the line conductor.

(d) Earthing

18. All exposed metal parts should be electrically bonded to a main earth terminal and be electrically continuous with the non-current-carrying metal-work of the electrical installation. Separate earthing conductors should not be smaller than 7/.029 in. copper or its equivalent.

(e) Terminals

19. These should have adequate current-carrying capacity and be such that connections will not slacken or overheat under normal conditions of use.

(f) Indicator lamps

20. A red indicator lamp should be incorporated to indicate when the supply is switched " on." Where considered necessary an additional white lamp should be provided to indicate when the heater circuit is " on." The lamps should be of a neon type and be protected by a suitable lens cover.

IV. Installation

21. The position of the fryer is important. It should not be in an alcove as fat collects on the surrounding fabric and this constitutes a fire risk: a heat build-up is also more likely and, in the event of fire, access is more difficult.

22. In the event of a fire occurring at the fish fryer, there must be means of preventing the fire from spreading into the fume discharge ductwork, as this may contain coagulated fat which is likely to ignite. A damper at the entrance to the extract duct, held open by a fusible link, provides this protection. Every discharge outlet in the canopy should be provided with fusible link dampers of this type. Where forced extraction is provided, some means of switching-off the fan is also desirable. This can be achieved by inserting a relay in the motor control circuit which is operated by the fusible link or by the damper in the extract duct.

23. It is highly desirable that ductwork should run outside the building directly after leaving the hood. It should be at least 9 in. from any woodwork and be surrounded by incombustible material where it passes through the building. It should conform with relevant building byelaws.

V. Operation and maintenance

24. Misuse of fryers helps to cause fires.

25. Cooking fat should be maintained at the correct level; overfilling causes overheating and increases splashing when food is lowered into the fat; an unduly low level of fat may prevent the thermostat from working.

26. Sometimes the type of fat or oil used is changed; the new type may have a different flash-point from that previously used. The hospital engineer should be told when a change is to be made, so that the thermostats may be reset if necessary.

27. Good maintenance is essential to reduce fire risk. Even the most reliable apparatus will fail in due course if it is not regularly inspected, overhauled and adjusted. Correct functioning of the thermostat is extremely important; it is the most important of the devices to prevent overheating and consequent firing of the fat and it must be kept in good order.

28. Fatty deposits should be removed frequently from the dampers and surrounding ductwork, and dampers operated by a fusible link should be checked for freedom of movement and correct balance.

29. Regular cleaning of the hob and surrounding metalwork, the hood, sides and back of the fryer, ductwork, fan blades and any filters is essential. Periodic inspection of all controls and of fire fighting equipment is essential.

VI. Fire extinguishers

30. Even if all the safety devices are incorporated in fryers it is essential that fire extinguishing apparatus should be close at hand. The most suitable are foam extinguishers and asbestos blankets. Enough of these should be provided in the kitchen and one of each should be situated near the fish fryer. Appendix F of HM(56)36 gives details of the maintenance procedure and general information about these and other extinguishing appliances.

31. In addition to the use of asbestos blankets the pan covers themselves may be used initially to smother a fire. If fryers are fitted with fixed covers, these should preferably be of the centre-hinged type and be easily removable. A pole, made of fire resisting material and with a metal hook, would be useful for moving the covers (attached or loose) into place.

32. More elaborate forms of fire protection could be provided, but unless the frying range is expensive and in frequent use it is doubtful if their cost is justified.

33. Kitchen staff do not always know where the fire fighting equipment is or how to use it. Experience shows that it is usually when relief kitchen staff are on duty, or when a kitchen is under-staffed, that fryers are left unattended and fires are more likely to occur. All kitchen staff should be given training in the use of the fire fighting appliances, and should participate in the fire drill given to staff generally. All new staff should be made aware of the fire precautions and positions of fire fighting appliances as part of their introduction to their work.

34. In the event of fire, some or all of the following action should be taken:

If pan covers are provided, they should be placed over the pans and covered by an asbestos blanket to prevent the fire spreading. If covers are not available, asbestos blankets should be used.

The gas isolating cock or electricity mains isolating switch should be turned off.

The fire brigade should be called immediately.

Windows and doors should be closed and foam extinguishers should be held in readiness for use.

Any flames should be tackled with the foam extinguishers.

APPENDIX

Approximate critical temperatures for various cooking oils and fats

	Normal frying temperature	*Smoking point temperature*	*Flashpoint open cup*	*Firing point*
Ground-nut oil Cotton-seed oil Maize-seed oil Rape-seed oil	360° F	415° F	610° F	665° F
Palm kernoil oil	320° F	390° F	580° F	620° F
Dripping	340° F	350° F	590° F	645° F
Palm Oil	360° F	405° F	605° F	655° F
Lard	350° F	360° F	612° F	655° F

Note:

Flashpoint—open cup is the lowest temperature at which combustion occurs but is not maintained in open vessels.

Firing point is the lowest temperature at which combustion is continuously supported.

References

BRITISH STANDARDS INSTITUTION

1. B.S.7: Rubber-insulated cables and flexible cords for electric power and lighting (for working voltages up to and including 11 Kv).
2. B.S.567: Asbestos cement flue pipes and fittings—light quality.
3. B.S.669: Flexible tubing and connector ends for appliances burning town gas.
4. B.S.715: Sheet metal cylindrical flue pipes, fittings and accessories for gas fired appliances.
5. B.S.717: Combustion testing of domestic appliances burning town gas.
6. B.S.835: Asbestos cement flue pipes and fittings, heavy quality.
7. B.S.2004: P.V.C.-insulated cables and flexible cords for electric power and lighting.
8. B.S.2848: Flexible insulating sleeving for electrical purposes.
9. B.S.3258: Silicone-rubber-insulated cables and flexible cords.

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10. H.M.(56)36: Hospital fire precautions.

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Printed in England under the authority of HER MAJESTY'S STATIONERY OFFICE by
The Campfield Press, St. Albans

(18565). Wt. 2536/9442. K.48. 5/62. S.P. & S. Gp. 999/133.

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Published by

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